



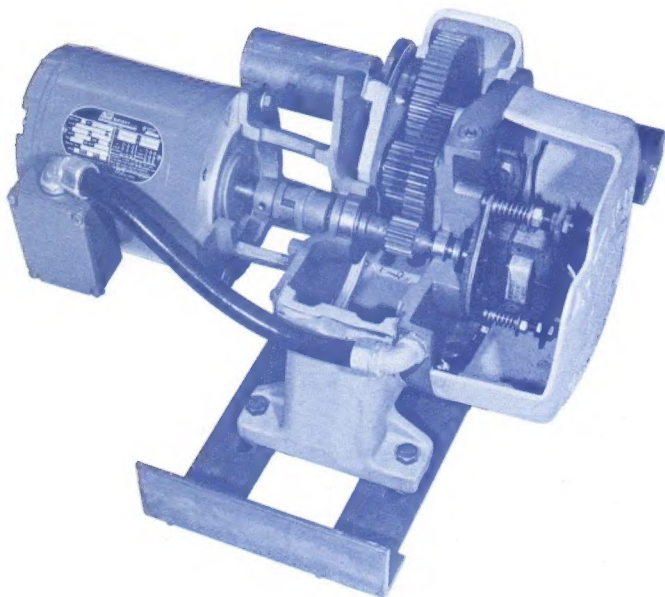
Acco Chain & Lifting Products Division

Issued 2-15-88
Supersedes 6-1-86

45-5

WORK-RATED®

SERIES 404 CENTER DRIVE UNITS FOR CRANES 1/2 TO 2 HP



The compact and adaptable Series 404 crane drive unit consists of a well proportioned gear reduction, electric motor, brake and controls. Designed for center driven crane and similar reversing applications, it is furnished with single speed, two speed or five step variable speed motors.

Exclusive Acco ACM solid state acceleration control is used with single speed and two speed motors for soft acceleration and deceleration with full loads or with no load, or with varying loads. Gentle action throughout entire operating cycle, ACM exhibits smooth buildup, slow acceleration for up to five seconds after start.

ACM provides smoother speed starts with measurably less pendulum swing than conventional systems.

Gentle deceleration is achieved by simply reversing the motor. The motor reverses instantly. The load slows gradually.

ACM allows the operator to precisely position the hook or load by moving the crane or trolley in small increments.

Completely solid state modular design provides full printed circuit reliability and minimum space requirements. The solid state components require no complicated adjustment or maintenance. Two simple screws are provided for field adjustment.

ACM is furnished prewired in standard NEMA 3R enclosure.

Series 404 crane drive unit is available in motors from 1/4 to 2 horsepower.

Series 404 crane drive units are self-contained and included in its many features is an automatic rectified DC magnetic actuated adjustable disc brake which reduces overrun. Fully enclosed motor makes unit adaptable for outside service.

The Series 404 crane drive unit may be mounted in several positions.

CONSTRUCTION FEATURES

MOTOR: The unit's motor is totally enclosed, 30 minute duty rated and is enclosed sealed ball bearing type, designed for reversing service. For single speed and two speed use, with ACM control, squirrel cage motors with class "B" insulation are furnished; for variable speed, slip ring induction with class "F" insulation is used.

Standard NEMA "C" face motors are provided for standard commercial power supplies. The motor has standard NEMA shaft extensions.

MOTOR BRAKE: Acco rectified DC magnet actuated adjustable disc brake has been proven in hours of in-service operation. It delivers rapid stops with minimal drift.

MOTOR CONTROL: Controllers are supplied in separate enclosures. Choose from single speed and two speed with ACM control, or five step variable speed. Controls are magnetic reversing type, mechanically and electrically interlocked with 115 control circuit. All wiring conforms to applicable NEC and CSA requirements. Controls include time delay fuses for branch circuit overcurrent protection plus control transformer with fused secondary circuit. NEMA type 3R enclosure is standard. Cover is lightweight, tough ABS material, deep drawn for maximum control accessibility. Variable speed controllers have five speed steps in each direction; acceleration or retardation is gradual. Push button is optional equipment.

GEARS: All gearing is machine cut, heat-treated alloy steel with shock resistant ductile cores and wear resistance surfaces. Gearing is designed to AGMA standards for maximum life and operates in an oil bath. All gear shafts are supported by precision ball bearings.

GEAR HOUSING: A variety of mounting positions is made possible by the interchangeability of the fill, drain and level plugs.

Output shaft is furnished complete with sleeve coupling.

WARNING: Only competent fabrication personnel familiar with standard fabrication practices should be employed to assemble these cranes because of the necessity of properly interpreting these instructions and for the purposes of determining appropriate compatible equipment and product applications. Acco disclaims any responsibility for the quality of workmanship employed in the fabrication of a crane according to these instructions or the sufficiency of the system in which and to which this system or equipment is to be installed or the sufficiency of the system to sustain any particular load that may be imposed upon it. Contact the Acco Products Division at 76 Acco Drive, York, Pennsylvania 17402 for additional information if necessary.

WARNING: Equipment described herein is not designed for, and should not be used for, lifting, supporting, or transporting humans. Failure to comply with any one of the limitations noted herein can result in serious bodily injury and/or property damage.

HOW TO SPECIFY *Work-rated* CENTER DRIVE COMPONENTS TO BUILD SERIES 524, 534, AND 544 MOTORIZED CRANES.

- Center drive components are factory matched. Do not mix with dual drive or hand operated components.
- Determine the type and capacity of crane and order appropriate end truck.

Underhung end trucks should be selected if the crane and its load can be supported from the roof truss. See master catalog, Section 42, for underhung single girder end trucks.

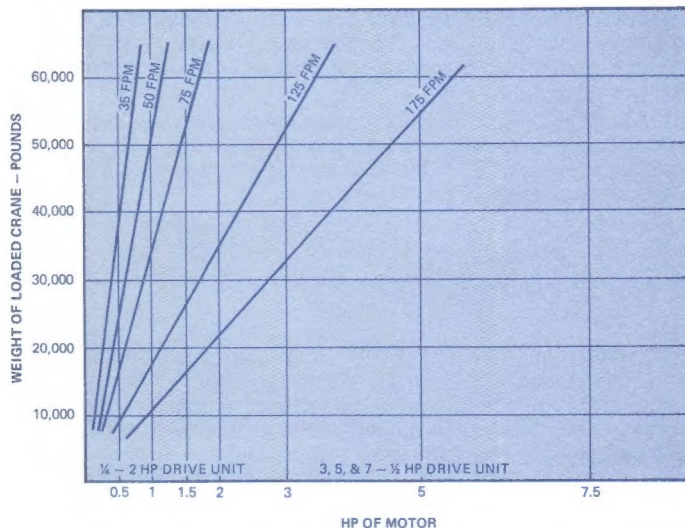
Top running end trucks should be selected if the crane and its load can be supported from the building column. See master catalog, Section 43, for top running single girder end trucks and Section 44 for top running double girder end trucks.

- Select appropriate Series 404 crane drive unit either by desired crane speed, necessary horsepower or total crane weight. These requirements may be determined three ways.

- Selection of crane drive horsepower by using master catalog pages for center driven cranes found on page 45-11 and 12.

To find necessary horsepower for drive unit when capacity of crane and desired speed are known:
Find the correct capacity and speed. Their intersection indicates necessary horsepower.

- Selection of crane drive unit by using graph.



To find necessary horsepower for drive unit when total weight of crane and desired speed are known:

Find the correct weight on vertical scale. Project a line from this point until it intersects the proper speed line. From this point of intersection, project a line down to the horizontal scale which indicates necessary horsepower.

To find maximum allowable load, reverse procedure above, beginning at the horizontal scale and reading the answer on the vertical scale.

NOTE: Load values for given speeds and horsepower apply to cranes on level, parallel, aligned runways and must not be exceeded. Consequently, when necessary horsepower is between two standard motors, select the larger. Shaft speeds based on 1800 RPM motor.

- Selection of crane drive unit by calculations.

To determine desired RPM of output shaft of drive unit, first ascertain the RPM of the crane wheel for the desired crane speed (FPM):

$$\text{RPM of wheel} = \frac{\text{desired FPM of crane}}{.262 \times \text{diameter of wheel in inches}}$$

Next, determine required RPM of crane drive shaft:

$$\text{RPM of drive shaft} = \frac{\text{teeth on gear ring} \times \text{RPM of wheel}}{\text{teeth on pinion}}$$

Last determine required horsepower of drive unit:

$$\text{HP} = \frac{WVR}{66 \times 10^6}$$

HP = Horsepower of motor

W = Weight of loaded crane - pounds

(Net load plus crane, trolley, and hoist)

V = Crane speed - FPM

R = Travel resistance

R = 25, up to 75 FPM

R = 30, 76 to 150 FPM

R = 35, 151 to 300 FPM

- Determine the control required for your application.

Work-rated Series 404 center drive units may be controlled in various ways to gain desired performance for your application.

Single speed or two speed with ACM, and five step variable speed control are available as standard equipment.

Control is shipped loose.

- Specify product number of drive unit.

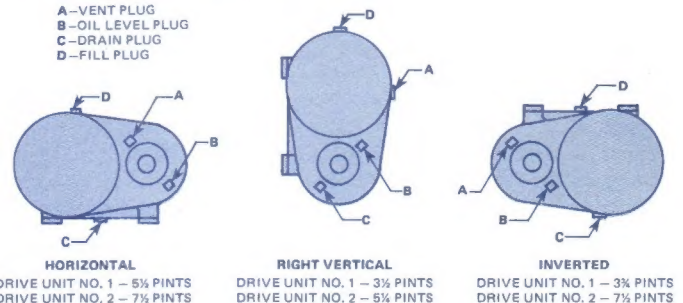
Capacity, RPM, horsepower and drive control are found in following pages.

- Specify motor voltage.

Acco standard motors are available in 200/230/460-3-60 power and are totally enclosed non-ventilated. 575-3-60 is available as optional equipment. Single speed and two speed motors are Class B insulation and five step variable speed is Class F insulation. Control shipped loose is furnished as standard equipment.

- Specify mounting position.

A-VENT PLUG
B-OIL LEVEL PLUG
C-DRAIN PLUG
D-FILL PLUG



Horizontal mounting position is standard. Right vertical and inverted mounting position must be specified.

- Specify optional drive unit mounting base.

Series 404 center drive units are available with optional drive unit mounting base.



WORK-RATED® SERIES 404 CENTER DRIVE UNITS FOR CRANES

45-7 Issued 2-15-88

1/2 to 2 HP

9. Specify push button station.

Push button station, drop of cord and strain chain are available as optional equipment. Standard control circuit is 110 volts. Other control circuit voltage must be specified. Control transformer provided is satisfactory for control supplied with drive unit. If larger transformer is required, specify volt-amp rating.

Specify drop of push button, calculated from bottom of control enclosure to center line of the push button. See Section 35, "F Push Button" subdivision, for further specifications. Controls and push button assembly are shipped loose for customer mounting.

10. **Determine shaft diameter** and order appropriate number of compression couplings and intermediate pillow blocks by product number.

Compression couplings



Requirements for compression couplings depend on shaft connections necessary — minimum of two per crane. Order by product number.

Product No.	Shaft Dia. (in.)
6404010	1 1/4
6404020	1 1/2

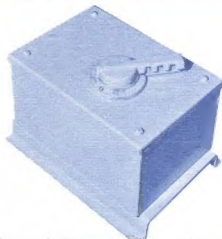
Intermediate pillow blocks



Intermediate pillow blocks must be used every 8 ft. to support squaring shaft. Order by product number.

Product No.	Shaft Dia. (in.)	Span (ft.)	Quantity Required
6404030	1 1/4	1-19	2
6404040	1 1/2	20-39	4
		40-48	6
		48-60	8

11. **Select applicable manual disconnect switch.**

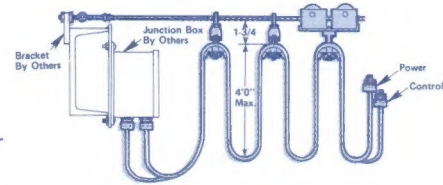


6400050	For 30 Amp 600v
6400060	For 60 Amp 600v

Manual disconnect switch assembly is fusible, but furnished less fuses. Capacity of manual disconnect switch determined by fuse size required by National Electrical Code 430-62. (Allowable fuse size of largest motor, based on NEC table 430-152, plus sum of full load currents of the other motors.) If ampacity of manual disconnect switch is not specified, Acco will supply 60 amp, 600v switch. Fuses of 30 amp or less will require adapters to fit 60 amp clips. Fuses and reducers not supplied. Order by product number.

12. **Determine the type and specify flat wire festooned tagline electrification.**

For single girder cranes



The wire supported festoon tagline kit is designed for electrical supply on runways or crane bridges up to 60 foot spans. Operating on a galvanized wire rope, the eyebolt and two wheel trolleys may be used in outdoor applications.

The kit contains the following:

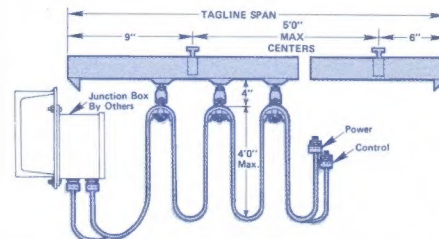
Flat wire cable or cables with		
Cord grips	Cable clamps	Eyebolt with nuts
Trolleys	Wire rope	

Product Number	Power		Control (a) No. of Conductors
	No. of Conductors	Max. Amps	
6400010	4	32	—
6400020	4	75	—
6400030	4	32	8
6400040	4	75	8

(a) A 12 wire control conductor cable is available on application.

To order specify product number, length of span, and total combined horsepower to be electrified by the kit.

For double girder cranes



The rigid track supported festooned tagline kit is designed for electrical supply on double girder crane bridges. Operating on a heavy gage galvanized track, the steel ball bearing four wheel trolley may be used in outdoor applications.

The kit contains the following:

Track channels	Four wheel trolley with saddle
Track joint clamps	assembly
Track hanger clamps	Flat wire cable or cables
Track end stops	Cord grips

Product Number	Power		Control (a) No. of Conductors
	No. of Conductors	Max. Amps	
6440010	4	32	—
6440020	4	75	—
6440030	4	32	8
6440040	4	75	8
6440050	4	32	12
6440060	4	75	12

(a) A 12 wire control conductor cable is available on application. To order specify product number, length of span, and total combined horsepower to be electrified by the kit.

13. **Select desired Acco hoist along with bridge and runway electrification conductor and collector system.**

FOR HOIST see master catalog sections

10 for "Hand-operated Hoist", 1/2 to 10 tons

20 for "Wright-way® Electric Hoist", 1/4 to 2 ton

30 for "Work-rated Hoist", 1 to 20 ton.

FOR ELECTRICAL CONDUCTOR AND COLLECTOR SYSTEMS see master catalog Section "Crane Accessories".

HP	Output Shaft Speed RPM	Output Shaft Torque lb - ft	Output Shaft Dia. inches	PRODUCT NUMBERS					
				Single Speed with ACM control	Net Weight lbs.	Two (a) Speed with ACM control	Net Weight lbs.	5 step Variable Speed	Net Weight lbs.
1/2	51	49.0	1 1/4	4040010	175	4040530	190	4041050	214
			1 1/2	4040020		4040540		4041060	
			1 3/4	4040030		4040550		4041070	
	75	33.3	1 1/4	4040040		4040560		4041080	
			1 1/2	4040050		4040570		4041090	
			1 3/4	4040060		4040580		4041100	
	115	21.8	1 1/4	4040070		4040590		4041110	
			1 1/2	4040080		4040600		4041120	
			1 3/4	4040090		4040610		4041130	
	172	14.5	1 1/4	4040100		4040620		4041140	
			1 1/2	4040110		4040630		4041150	
			1 3/4	4040120		4040640		4041160	
1	51	98.0	1 1/4	4040130	182	4040650	197	4041170	219
			1 1/2	4040140		4040660		4041180	
			1 3/4	4040150		4040670		4041190	
	75	66.7	1 1/4	4040160		4040680		4041200	
			1 1/2	4040170		4040690		4041210	
			1 3/4	4040180		4040700		4041220	
	115	43.5	1 1/4	4040190		4040710		4041230	
			1 1/2	4040200		4040720		4041240	
			1 3/4	4040210		4040730		4041250	
	172	29.1	1 1/4	4040220		4040740		4041260	
			1 1/2	4040230		4040750		4041270	
			1 3/4	4040240		4040760		4041280	
1 1/2	75	100.0	1 1/4	4040250	184	4040770	199	4041290	220
			1 1/2	4040260		4040780		4041300	
			1 3/4	4040270		4040790		4041310	
	115	65.3	1 1/4	4040280		4040800		4041320	
			1 1/2	4040290				4041330	
			1 3/4	4040300				4041340	
	172	43.6	1 1/4	4040310				4041350	
			1 1/2	4040320				4041360	
			1 3/4	4040330				4041370	
	246	30.1	1 1/4	4040340				4041380	
			1 1/2						
			1 3/4						
2	115	86.9	1 1/4		197				222
			1 1/2						
			1 3/4						
	172	58.2	1 1/4						
			1 1/2						
			1 3/4						
	246	40.7	1 1/4						

(a) Two Speed Drives are 1800/600 RPM.

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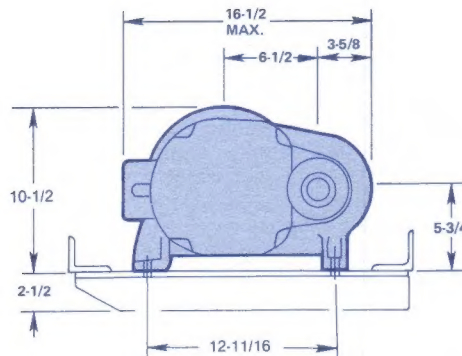
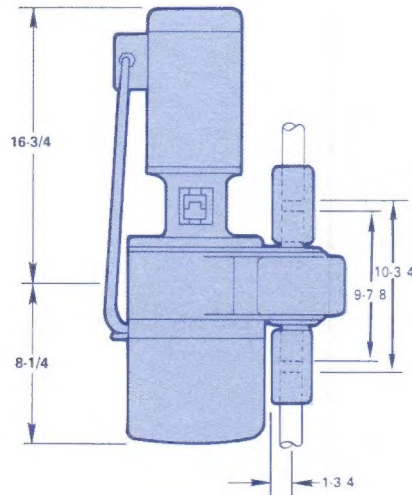
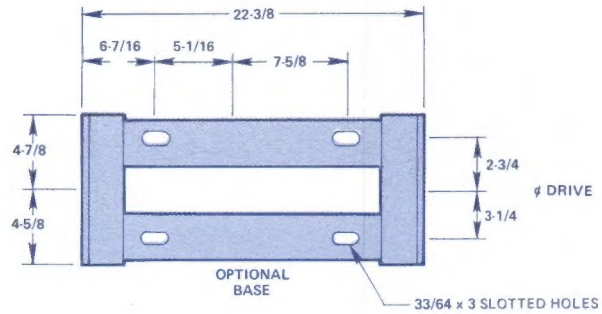
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WORK-RATED® SERIES 404 CENTER DRIVE UNITS
FOR CRANES
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**1/2 to 2
HP**

1/2 to 2 HP



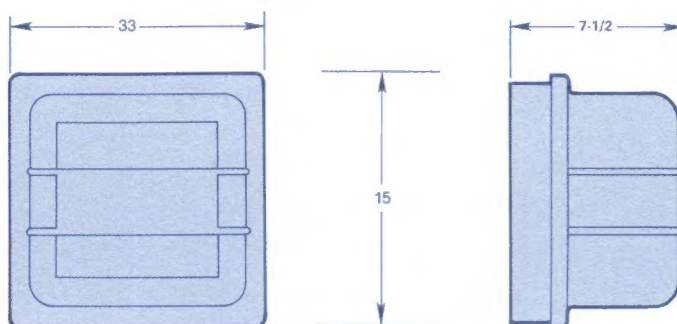
All dimensions shown in inches

**1/2 to 2
HP**

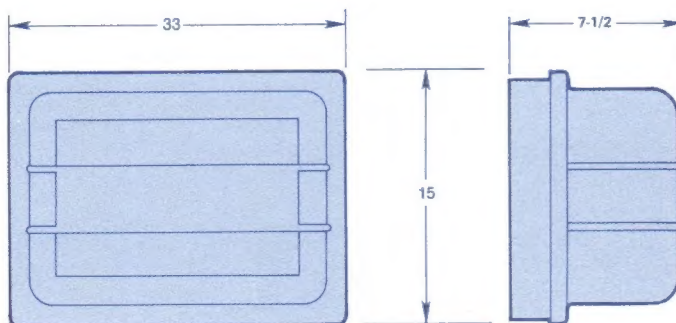
**WORK-RATED® SERIES 404 CENTER DRIVE UNITS
FOR CRANES**

45-10

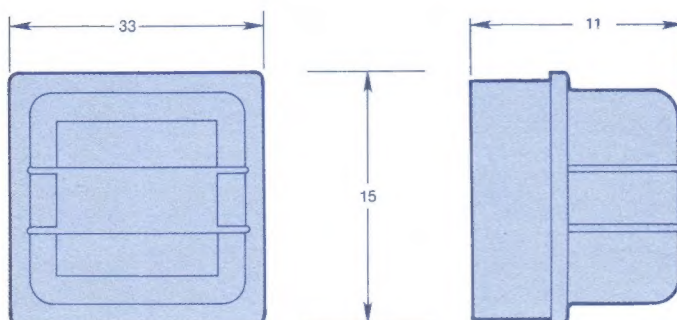
SINGLE SPEED CONTROL WITH ACM



TWO SPEED CONTROL WITH ACM



5-STEP VARIABLE SPEED CONTROL



All dimensions shown in inches.

NOTE: There are no warranties which extend beyond the description on the Order Acknowledgement and as it may apply to the specifications provided in this publication. THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE EXCLUDED. Acco shall in no event be liable for any special, direct, indirect, incidental or consequential damages to anyone beyond the cost of replacement of the goods sold hereby.

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288 2.5M AP
Printed in U.S.A.



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SERIES 404 CRANE DRIVE UNIT SELECTION TABLES

TABLE 1 — FOR UNDERHUNG SINGLE GIRDER MOTOR DRIVEN CRANES — CENTER DRIVE

Crane Cap (tons)	75 FPM Crane Speed					125 FPM Crane Speed					175 FPM Crane Speed				
	Span (Ft.)	H.P.	Single Speed With ACM	Two Speed With ACM	Five Step Variable Speed	Span (Ft.)	H.P.	Single Speed With ACM	Two Speed With ACM	Five Step Variable Speed	Span (Ft.)	H.P.	Single Speed With ACM	Two Speed With ACM	Five Step Variable Speed
1	to 49	½	4040050	4040570	4041090	to 40	½	4040070	4040590	4041110	to 50	1	4040190	4040710	4041230
						41-48	1	4040170	4040690	4041210					
2	to 48	½	4040050	4040570	4041090	to 30	½	4040070	4040590	4041110	to 25	1	4040190	4040710	4040710
						31-48	1	4040170	4040690	4041210	25-48	1½	4040270		4041310
3	to 25	½	4040050	4040570	4041090	to 25	1	4040170	4040690	4041210	to 25	1	4040190	4040710	4041230
	26-48	½	4040060	4040580	4041100	26-48	1	4040180	4040700	4041220	26-30	1	4040200	4040720	4041240
											31-43	1½	4040280		4041320
5-6	to 30	½	4040060	4040580	4041100	to 35	1	4040180	4040700	4041220	to 48	2	4040340		4041380
	31-48	1	4040160	4040680	4041200	36-48	1½	4040260		4041300					
7½	to 48	1	4040160	4040680	4041200	to 40	1½	4040260		4041300	to 25	2	4040340		4041380
						41-48	2	4040320		4041360	26-48	3	ON APPL.	ON APPL.	ON APPL.
10	to 48	1	4040160	4040680	4041200	to 20	1½	4040260		4041300	to 40	3	ON APPL.	ON APPL.	ON APPL.
						21-48	2	4040320		4041360	41-48	5	ON APPL.	ON APPL.	ON APPL.

TABLE 2 — FOR TOP RUNNING SINGLE GIRDER MOTOR DRIVEN CRANES — CENTER DRIVE

Crane Cap (tons)	75 FPM Crane Speed					125 FPM Crane Speed					175 FPM Crane Speed				
	Span (Ft.)	H.P.	Single Speed With ACM	Two Speed With ACM	Five Step Variable Speed	Span (Ft.)	H.P.	Single Speed With ACM	Two Speed With ACM	Five Step Variable Speed	Span (Ft.)	H.P.	Single Speed With ACM	Two Speed With ACM	Five Step Variable Speed
1	to 50	½	4040050	4040570	4041090	to 40	½	4040070	4040590	4041110	to 50	1	4040190	4040710	4041230
						41-50	1	4040170	4040690	4041210					
2	to 50	½	4040050	4040570	4041090	to 30	½	4040070	4040590	4041110	to 45	1	4040190	4040710	4041230
						31-50	1	4040170	4040690	4041210	46-50	1½	4040270		4041310
3	to 50	½	4040050	4040570	4041090	to 50	1	4040170	4040690	4041210	to 30	1	4040190	4040710	4041230
											31-50	1½	4040270		4041310
5-6	to 30	½	4040060	4040580	4041100	to 35	1	4040180	4040700	4041220	to 20	1½	4040280		4041320
	31-50	1	4040160	4040680	4041200	36-50	1½	4040260		4041300	21-50	2	4040340		4041380
7½	to 50	1	4040160	4040680	4041200	to 40	1½	4040260		4041300	to 25	2	4040340		4041380
						41-50	2	4040320		4041360	26-50	3	ON APPL.	ON APPL.	ON APPL.
10	to 50	1	4040160	4040680	4041200	to 50	2	4040320		4041360	to 40	3	ON APPL.	ON APPL.	ON APPL.
											41-50	5	ON APPL.	ON APPL.	ON APPL.

Note: See Crane Drive Data Sheets (Pages 45-6 through 45-7) for complete specifications before ordering.

**1/2 to 2
HP****WORK-RATED® SERIES 404 CENTER DRIVE UNITS
FOR CRANES**

45-12

TABLE 3—FOR TOP RUNNING DOUBLE GIRDER MOTOR DRIVEN CRANES—CENTER DRIVE

Crane Cap. (tons)	75 FPM CRANE SPEED					125 FPM CRANE SPEED					175 FPM CRANE SPEED				
	Span (ft.)	H.P.	Single Speed with ACM	Two Speed with ACM	Five Step Variable Speed	Span (ft.)	H.P.	Single Speed with ACM	Two Speed with ACM	Five Step Variable Speed	Span (ft.)	H.P.	Single Speed with ACM	Two Speed with ACM	Five Step Variable Speed
3	to 40	1/2	4040060	4040580	4041100	to 40	1	4040180	4040700	4041220	to 35	1 1/2	4040280	4040800	4041320
	41-60	1	4040160	4040680	4041200	41-50	1 1/2	4040260	NA	4041300	36-50	2	4040340	NA	4041380
						51-60	2	4040320	NA	4041360	51-60	3	ON APPL.	ON APPL.	ON APPL.
5	to 60	1	4040160	4040680	4041200	to 40	1 1/2	4040260	NA	4041300	to 40	2	4040340	NA	4041380
						to 60	2	4040320	NA	4041360	41-60	3	ON APPL.	ON APPL.	ON APPL.
						to 25	1 1/2	4040260	NA	4041300	to 50	3	ON APPL.	ON APPL.	ON APPL.
7 1/2	to 50	1	4040160	4040680	4041200	to 25	1 1/2	4040260	NA	4041300	to 50	3	ON APPL.	ON APPL.	ON APPL.
	51-60	1 1/2	4040240	NA	4041280	26-50	2	4040320	NA	4041360	51-60	5	ON APPL.	ON APPL.	ON APPL.
						51-60	3	ON APPL.	ON APPL.	ON APPL.					
10	to 40	1	4040160	4040680	4041200	to 40	2	4040320	NA	4041360	to 35	3	ON APPL.	ON APPL.	ON APPL.
	41-60	1 1/2	4040240	NA	4041280	41-60	3	ON APPL.	ON APPL.	ON APPL.	36-60	5	ON APPL.	ON APPL.	ON APPL.

Crane Cap. (tons)	80 FPM CRANE SPEED					140 FPM CRANE SPEED					200 FPM CRANE SPEED				
	Span (ft.)	H.P.	Single Speed with ACM	Two Speed with ACM	Five Step Variable Speed	Span (ft.)	H.P.	Single Speed with ACM	Two Speed with ACM	Five Step Variable Speed	Span (ft.)	H.P.	Single Speed with ACM	Two Speed with ACM	Five Step Variable Speed
15	to 60	3	ON APPL.	ON APPL.	ON APPL.	to 35	3	ON APPL.	ON APPL.	ON APPL.	to 40	5	ON APPL.	ON APPL.	ON APPL.
						36-60	5	ON APPL.	ON APPL.	ON APPL.	41-60	7 1/2	NA	NA	ON APPL.
20	to 60	3	ON APPL.	ON APPL.	ON APPL.	to 60	5	ON APPL.	ON APPL.	ON APPL.	to 60	7 1/2	NA	NA	ON APPL.

Note: See Crane Drive Data Sheets (Pages 45-6 through 45-7) for complete specifications before ordering.

WARNING: Equipment described herein is not designed for, and should not be used for, lifting, supporting or transporting humans.

Failure to comply with any one of the limitations noted herein can result in serious bodily injury and/or property damage.

**Chain & Lifting Products Division**

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